Knitted Fabrics

A KNITTED FABRIC, a structure of rows of loops hanging on other rows of loops, is made by pulling loops through loops.

Each vertical or lengthwise row of loops is called a wale. Each crosswise row of loops is called a course.

If the loops are stretched in any direction, they tend to return to their normal or relaxed shape. Knit goods therefore are elastic and have an advantage over woven goods.

Knitting is a craft that dates from antiquity. Master knitters made exquisite carpets, berets, shirts, afghans, shawls, and hosiery, some of which now, centuries later, are on exhibit in museums. The beginning of the machine age in the 19th century brought the decline of hand knitting as an industry.

Knitting continued in the home, however. More and more women (and men, too) knit now.

They consider knitting a rewarding, creative, relaxing, and inexpensive hobby and a productive undertaking for the odd moments at the hairdresser, say, or during longer periods.

Knitting is easy. One needs only two needles and some yarn. Pattern books and books on knitting give enough information for you to get started, but it is best to have some instruction at first. The needlework sections of department stores often give free lessons. In many communities you can get professional help in classes or schools.

The two classes of knitted fabrics are the filling knit and the warp knit.

Filling knit fabrics are quickly identified. They can be raveled readily, and they easily develop runs, or ladders, when a yarn is broken. In a flat piece, the yarn is raveled back and forth; in a circular fabric, around and around, as in a hand-knitted sock.

In filling knitting, the two basic stitches are the plain (jersey or stockinette) and the purl. The rib is made by alternating the plain and purl stitches. The way the loops are meshed determines the kind of stitch.

In the plain stitch, all the loops are drawn through others to the same side of the fabric. The face of the fabric is characterized by the wales running lengthwise; the back, by crosswise ridges.

In the purl stitch, also called the links-and-links stitch, the loops of alternate courses are drawn to opposite sides of the fabric. Both sides of the fabric look the same; the ridges run widthwise.

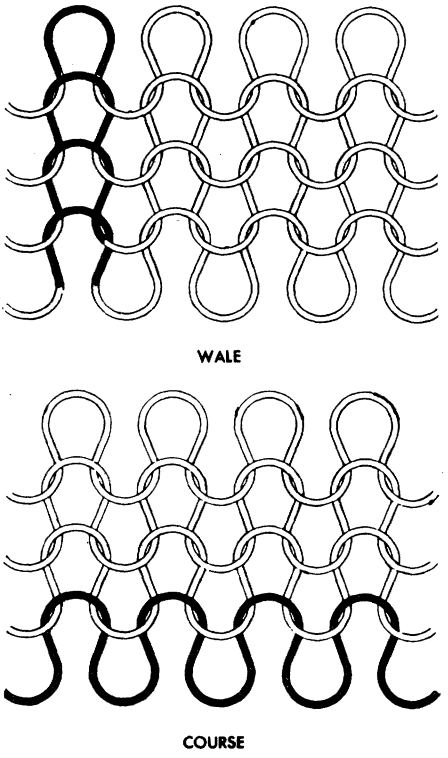
In rib knitting, the loops of the same course are drawn to both sides of the fabric. A rib fabric is the same on both sides. If the loops alternate one on one side and one on the other, it is called 1 x 1 rib. A 2 x 2 rib is called a Swiss rib.

Hand- and machine-filling knit fabrics may be circular or flat knitted. The circular knit comes off the knitting needles in a tubular form; the yarns run continuously in one direction across the fabric. The flat knit is a flat form in which the yarns run alternately back and forth.

Filling knit comprises a large part of the knit goods manufactured by machine and is organized around four major knitting systems: Plain, rib, purl, and interlock.

Of these, the plain knit comprises the largest yardage and is used in hosiery, underwear, and outerwear. It can be knit of the finest of yarns with as many as 50 wales per inch or with coarse yarns with as few as 3 loops per inch. Plain knit has considerable elasticity in both directions.

Rib knitting has much more elas-



Knitted structure showing wale and course.

ticity in the width than the plain because loops in certain wales are meshed in opposite directions to those in remaining wales.

Rib fabrics are used for slim-fit lingerie, half hose, and welts for pullovers. Rib fabrics are used in an unstretched form for many garments in which double thickness is desired.

Purl knitting is used largely in the manufacture of infants' and children's garments, as it more closely resembles hand knitting and produces the desired characteristics of softness and loftiness.

Interlock is a circular filling knitted material. This type of construction may be thought of as a double cloth made of two separate 1 x 1 rib fabrics so that the wales of one fabric lie between those of the other on both the face and back. The yarn forms loops on both sides of the fabric. Both sides have the appearance of a plain knit fabric.

Interlock is ideal for high-quality garments, such as T-shirts, sport shirts, pajamas, children's play clothes, and gloves.

Many double-knit fabrics that are variations of the plain interlock constructions are manufactured. Many are fabrics used by the garment trade for women's high-fashion dresses and suits. The double knits most commonly used for outerwear are the French and Swiss double piques. In each, alternate yarns form loops on the back and not on the face of the cloth. These fabrics do not stretch so much and hold their shape better than the plain interlock.

Unlimited variations in designs in filling knit fabrics are produced by using stitches other than plain, purl, and rib. Three of the commonest are the tuck, lace, and float stitches.

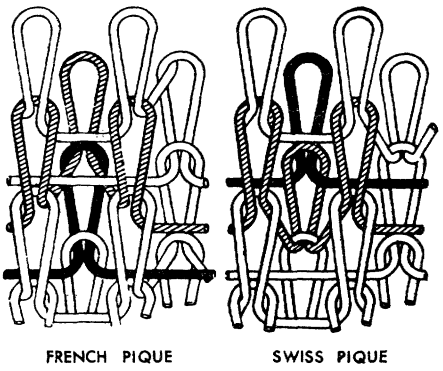
WARP KNITTING is one of the major knitting systems. Fabrics made by this system can be identified by determining the direction of the yarns that run lengthwise instead of crosswise. These fabrics do not readily develop runs when a yarn is broken and cannot be easily raveled. Most must be raveled on three or more yarns.

Warp-knit fabrics range in design from tight constructions to open structures similar to laces. The cloth is finished in widths from 80 inches or less up to 160 inches and is sold as piece goods, which is cut and made into garments.

Warp-knit fabrics are not so elastic and cannot compete with the production of circular filling knit fabrics, but designs of greater variety can be made.

Warp-knit fabrics must have at least one yarn for each wale of the fabric. Filling knit fabrics need but one yarn to form all the wales. A thousand or more yarns from a beam are fed into the knitting machine at the same time and are laid on needles. By the knitting action of the needle, each warp yarn is formed into loops, which are interlocked with adjacent loops made by warp yarns on either side.

The primary stitches in warp knit-



Double-knit fabrics.

ting are ordinary, chain, inlay, and float. In one of the drawings, the ordinary stitch is shown with the open loop, *a*, and the closed loop, *b*. The loop may mesh with a loop in an adjacent wale or with a loop in another wale. This stitch when used alone forms the simplest of warp fabrics.

The chain stitch may have open loop, *a* and *b*, or closed loop, *c*. The loops of one yarn mesh in only one wale. Therefore, unlike the ordinary stitch, it cannot form a fabric when it is used alone, but it imparts a great deal of stability to the structure when it is combined with other stitches.

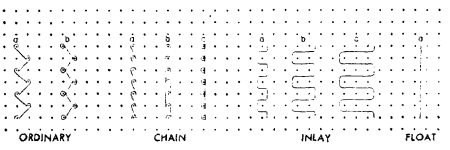
The inlay and float stitches do not form loops. They impart bulk and stability to the fabric. The float extends lengthwise of the fabric without changing direction, while the inlay extends over one or more wales.

By far the greater portion of warp-knit materials is made on the tricot machine. The most popular fabric knit on this machine is made of two sets of warp yarns and is commonly called a two-bar tricot. The face of the tricot fabric shows vertical rows of loops and has the same appearance as the face of a plain knit fabric. The back shows horizontal rows of laps or floats. The fabric may be made in stripes, mesh, and elaborate designs. Examples of this fabric are the rayon and nylon jerseys used for women's dresses, blouses, and lingerie.

THE INHERENT characteristics of knitted fabrics make them desirable for many purposes. They will stretch under tension and recover their dimensions to a considerable extent when tensions are released.

Knitted garments conform to the shape of the body and are comfortable to wear. Knitted fabrics are more absorbent and warmer than woven fabrics of comparable weight. It is not always necessary to iron them after they are laundered. These materials are especially desirable for underwear and for sport and travel outerwear.

The most distinctive characteristic of a knitted fabric is its ability to take up the shape of the wearer and to recover its original shape—elasticity—after being worn.

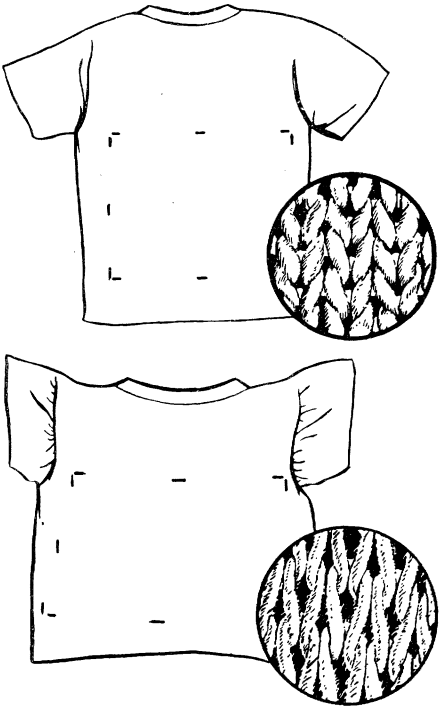


Primary stitches used in warp knitting.

Knitted fabrics are elastic because of their loop construction. Each loop behaves like a tiny spring, which tends to return to its normal or relaxed shape if stretched in any direction. Fabrics vary in their elasticity because of the fiber of which the yarn is spun and of the way the yarn is knit.

A wool fiber is more elastic than a cotton fiber. A fabric knit of wool therefore will hold its shape better than a fabric knit of cotton in the same construction. If cotton yarn is firmly knit, however, the fabric will hold its shape.

Some knitted garments shrink in length and stretch in width in laundering. The cause of the excessive change in dimensions is the distortion of the shape of the knitted loop, which has been elongated in the finishing operations. In laundering, the loop is relaxed and returns to its natural round shape.



T-shirts after 20 washes with tumble drying. Inserts show closeup of knit fabric before laundering; ink marks on shirts originally marked a 10-inch square.

Because of distortion in finishing, many knit garments are unsatisfactory in size and in appearance after laundering.

For example, the plain knit cotton T-shirt in one of the drawings made of the fabric with elongated loops shrank in length and stretched in width and has ruffled sleeve seams and a stretched neckband. The T-shirt made of the fabric with round loops held its shape in laundering and maintained its attractive appearance.

HOW CAN ONE select knit garments that will not shrink or stretch?

Choose those with the round loops. This is not always easy, especially in a finely knit fabric. A sure way is to count the number of loops in a 1-inch distance both lengthwise and widthwise of the fabric. In case of a plain knit, the number of loops lengthwise should be approximately 1.1 times the number widthwise. For example, plain knit that has 30 wales per inch should have about 33 courses per inch.

Much of the knit piece goods in retail stores is not properly finished and hence will shrink and stretch in laundering. These materials may be relaxed in the home before they are made into garments.

Knit fabrics of wool may be lightly steamed, pressed, and allowed to lie flat before cutting.

Piece goods knit of cotton as well as other fibers may be relaxed by wetting out thoroughly, extracting or drying in a towel, and tumbler dried. If you do not tumble dry it, lay the fabric flat without distorting it for drying. (HAZEL M. FLETCHER)

Stretch Fabrics

STRETCH FABRICS are the sort of thing that leads one to ask, "Why didn't somebody think of it before?"

They provide better fit for many items, from baby clothes to upholstery. They come in many weights, fibers, colors, and finishes. Some have little stretch; others, much. Some give ease of movement or a smooth fit; others, forceful control.

We can classify their stretch in two ways.

One is the power stretch, of the kind built into foundation garments, swimsuits, men's tummy-restraining shorts and briefs, and so on.

The other is comfort, or action, stretch. It is used in children's garments, sport and casual clothes, men's